

9.15

a) $\frac{\sqrt[4]{6}}{\sqrt[4]{6}} = \frac{6^{\frac{1}{2}}}{6^{\frac{1}{4}}} = 6^{\frac{1}{2} - \frac{1}{4}} = 6^{\frac{1}{4}} = \sqrt[4]{6}$

b) $\sqrt[12]{6} \cdot \sqrt[4]{6} = 6^{\frac{1}{12}} \cdot 6^{\frac{1}{4}} = 6^{\frac{1}{12} + \frac{3}{12}} = 6^{\frac{4}{12}} = 6^{\frac{1}{3}} = \sqrt[3]{6}$

c) $\sqrt[4]{3^5} = 3^{\frac{5}{4}} = 3^{1 + \frac{1}{4}} = 3^1 \cdot 3^{\frac{1}{4}} = 3\sqrt[4]{3}$

$\sqrt[4]{3^5} = \sqrt[4]{3 \cdot 3 \cdot 3 \cdot 3 \cdot 3} = \sqrt[4]{3 \cdot 3 \cdot 3 \cdot 3} \cdot \sqrt[4]{3} = 3\sqrt[4]{3}$

d) $\sqrt[16]{81} = \sqrt[16]{9^2} = 9^{\frac{2}{16}} = 9^{\frac{1}{8}} = (3^2)^{\frac{1}{8}} = 3^{2 \cdot \frac{1}{8}} = 3^{\frac{1}{4}} = \sqrt[4]{3}$

TA: $\sqrt[16]{81} = \sqrt[16]{3^4} = 3^{\frac{4}{16}} = 3^{\frac{1}{4}} = \sqrt[4]{3}$

9.16

a) $0^{-2} = \frac{1}{0^2} = \frac{1}{0}$ $\downarrow$ nicht möglich

$\frac{6}{2} = 3 \Rightarrow 2 \cdot 3 = 6 \%$
 $\frac{1}{5} = 0.2 \Rightarrow 0.5 = 1 \%$

b) $(-8)^{\frac{1}{3}} = \sqrt[3]{-8} = -2$

$(-8)^{\frac{2}{6}} = \sqrt[6]{(-8)^2} = \sqrt[6]{64} = 2$ $\leftarrow$ d. andere

$(-8)^{\frac{2}{6}} = (\sqrt[6]{-8})^2$ $\leftarrow$ d. meärilich

$\Rightarrow$ meärilich $a^{\frac{m}{n}}, a > 0$

9.18

$\sqrt[3]{2}, \sqrt{2}, \sqrt[6]{16}, \dots$

$\begin{cases} \sqrt[3]{2} \cdot q = \sqrt{2} \\ \sqrt{2} \cdot q = \sqrt[6]{16} \end{cases} \Rightarrow q = \frac{\sqrt{2}}{\sqrt[3]{2}} = \frac{2^{\frac{1}{2}}}{2^{\frac{1}{3}}} = 2^{\frac{1}{2} - \frac{1}{3}} = 2^{\frac{1}{6}} = \sqrt[6]{2}$

$\Rightarrow q = \frac{\sqrt[6]{16}}{\sqrt{2}} = \frac{\sqrt[6]{2^4}}{\sqrt{2}} = \frac{2^{\frac{4}{6}}}{2^{\frac{1}{2}}} = \frac{2^{\frac{2}{3}}}{2^{\frac{1}{2}}} = 2^{\frac{2}{3} - \frac{1}{2}} = 2^{\frac{1}{6}} = \sqrt[6]{2}$

$\Rightarrow q = \sqrt[6]{2}$

$\Rightarrow$ same $q \Rightarrow$ waite